

CLAIMS

[CLAIM SET 1—BROAD APPARATUS]

1. A micro-opto-electromechanical apparatus comprising:
 - a silicon wafer comprising a plurality of layers;
 - a reflector formed in one or more of the plurality of layers; and
 - a pattern on the reflector to focus or collimate an incident beam of radiation into a reflected beam.
2. The apparatus of claim 1 further comprising a second reflector positioned at a second selected angle relative to the reflected beam.
3. The system of claim 2 wherein the second reflector is a scanning mirror capable of rotating about one or more axes.
4. The apparatus of claim 1 wherein the pattern is a Fresnel pattern that is circular or elliptical.
5. The apparatus of claim 1 wherein the pattern comprises a plurality of uniformly spaced bands.
6. The apparatus of claim 1 wherein the pattern comprises a plurality of non-uniformly spaced bands.
7. The apparatus of claim 1 wherein the pattern is covered with a highly reflecting coating.
8. The apparatus of claim 7 wherein the coating is gold.
9. The apparatus of claim 1 wherein the radiation is electromagnetic radiation in the visible portion of the spectrum.
10. The apparatus of claim 1 wherein the radiation is electromagnetic radiation in the infrared portion of the spectrum.

[CLAIM SET 2 – NARROW APPARATUS]

11. A micro-opto-electromechanical apparatus comprising:
 - a wafer comprising a single crystal silicon (SCS) layer separated by an insulator layer from a substrate layer;
 - a reflector formed in the SCS layer; and
 - a pattern formed on a surface of the reflector to focus the incident beam into a reflected beam.
12. The apparatus of claim 11 further comprising a second reflector positioned at a second selected angle relative to the reflected beam.
13. The system of claim 12 wherein the second reflector is a scanning mirror capable of rotating about one or more axes.
14. The apparatus of claim 11 wherein the pattern is a Fresnel pattern which is circular or elliptical.
15. The apparatus of claim 11 wherein the pattern comprises a plurality of uniformly spaced bands.
16. The apparatus of claim 11 wherein the pattern comprises a plurality of non-uniformly spaced bands.
17. The apparatus of claim 11 wherein the pattern is covered with a highly reflecting coating.
18. The apparatus of claim 17 wherein the coating is gold.
19. The apparatus of claim 11 wherein the radiation is electromagnetic radiation in the visible portion of the spectrum.
20. The apparatus of claim 11 wherein the radiation is electromagnetic radiation in the infrared portion of the spectrum.

[CLAIM SET 3 -- SYSTEM]

21. A micro-opto-electromechanical system comprising:
 - a wafer comprising a single crystal silicon (SCS) layer separated by an insulator layer from a substrate layer;
 - a radiation source attached to a layer of the wafer;
 - a reflector formed in the SCS layer; and
 - a pattern formed on a surface of the reflector to focus or collimate the incident beam into a reflected beam.
22. The system of claim 21 further comprising a second reflector positioned at a selected angle relative to the reflected beam.
23. The system of claim 22 wherein the second reflector is a scanning mirror capable of rotating about one or more axes.
24. The apparatus of claim 21 wherein the pattern is a Fresnel pattern which is circular or elliptical.
25. The apparatus of claim 21 wherein the pattern comprises a plurality of uniformly spaced bands.
26. The apparatus of claim 21 wherein the pattern comprises a plurality of non-uniformly spaced bands.
27. The apparatus of claim 21 wherein the pattern is covered with a highly reflecting coating.
28. The apparatus of claim 27 wherein the coating is gold.
29. The apparatus of claim 21 wherein the radiation is electromagnetic radiation in the visible portion of the spectrum.
30. The apparatus of claim 21 wherein the radiation is electromagnetic radiation in the infrared portion of the spectrum.